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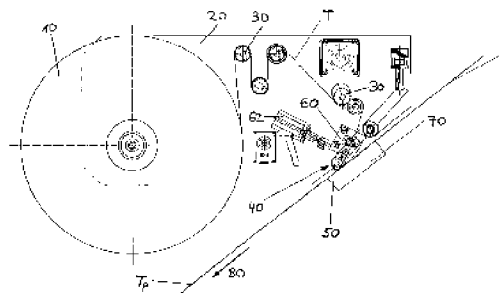
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The following statements are those taken from the records submitted by the applicant

Test proposition is conducted in accordance with § 44 PatGs.

(54) Title: **Procedures and devices for producing a packaging foil for moisture-sensitive products**

(57) Summary: The invention concerns a procedure and a device for producing a packaging foil for moisture-sensitive product P, in which a primary packaging foil V, in particular a heat seal-able foil, as well as a desiccant T are prepared in the form of at least a sheet construction or at least a strip. The desiccant T is put on the face of the primary packaging foil V, such that after a final stage of a package Vp, is to be folded on the inside I of package Vp. The desiccant strip T is cut into individual desiccant sheets or strips Tp, the have the dimensions or are placed on the primary packaging foil V, such that after the positioning and finishing of the package Vp they are arranged only on the inside I of a package unit Vp and not in a closing area R, in particular the edge-sealing, of the package unit Vp.



Description

[0001] The invention concerns a procedure and a device for producing a packaging foil for moisture-sensitive products, as well as a procedure and a device for packing moisture-sensitive products.

State of the Art

[0002] Known Products, as for example electronic components, medical or other diagnose or test strips, certain medications, as for example particular penicillin, and the like, are sensitive against moisture. In order not to impair the effectiveness and quality of products of this type and to make storable and durable, it is necessary to add desiccants in packaging them. Such desiccants are normally placed in the package directly beside the moisture-sensitive product, in order possibly to absorb any moisture before hand in the package or penetrating into it from outside arranged and thereby , to keep it away from the product.

[0003] In the State of the Art it is known, for this purpose in the framework the wraps of the moisture sensitive products to add one or more bags with granular desiccant into the package. However, this procedure has the disadvantage in that they or the desiccant bags are placed loosely in the package. Therefore, they can slip in the inside of the package and can possibly damage the product with it or can be moved so far from it, that the drying action is no longer sufficiently guaranteed. When opening the package, the desiccant can immediately fall out of the package. Besides, the danger exists that the user of the product under certain circumstances cannot distinguish the desiccant when opening the packet from the actual product, what is especially critical in the case of medications. Such cases have been known, in which there has been mix-ups and in which patients have taken the desiccant instead of the medication.

[0004] In order to avoid disadvantages of this type, in the State of the Art, under another implementation, It or the bags with desiccant are glued either directly onto the moisture-sensitive product or on the inside of the package. However, this is not a suitable solution. Since unfavorably itself in the chief reindeer case the glue on the product from works and can damage this, and since in the second case the desiccant can be positioned too far from the product to be

protected, thereby sufficient drying action cannot be guaranteed.

Task Designation

[0005] The invention has as its task to overcome the disadvantages of the Stand of the Art and in particular to create a procedure and an device to produce a package for moisture-sensitive products with the use of a desiccant, in which the desiccant of this type is arranged within the package, that the product protecting drying action develops and the product is secure against damage and with which any change between product and desiccant should be prevented by the user.

[0006] This task is resolved by means of a procedure for producing a packaging foil for moisture-sensitive products according to Patent claim as well as by means of a corresponding device according to Patent claim 12. This task is resolved further through a procedure for packing moisture-sensitive products in according to Patent claim 10 as well as through a corresponding device according Patent claim 20.

[0007] In the procedure for producing a packaging foil for moisture sensitive products according to the invention, a primary packaging foil, in particular a heat seal-able foil, as well as a desiccant in the form at least a sheet structure or at least strips, are prepared. The desiccant is placed on one face of the primary packaging foil, in the case of a heat seal-able packaging foil, in particular by heat-sealing, that after completing a package for a moisture-sensitive product, the product is folded inside of the package.

[0008] In a device according to the invention for producing a packaging foil for moisture sensitive products, methods for the preparation of a primary packaging foil, in particular a heat seal-able foil, as well as methods for the preparation of a desiccant in the form of at least a sheet structure or at least strips, are provided. The device shows the additional method of placing the desiccant on the face of the primary packaging foil, in the case of a heat seal-able packaging foil, in particular by heat-sealing, that after completing a package for a moisture-sensitive product, the product is turned inside of the package.

[0009] The procedure according to the invention and the device according to the invention have the advantage, in that the desiccant is no longer

in the form of a bag of desiccant granules lying loosely in the package or that the bag of desiccant granules must be attached to the product or on the inside of the package. According to the invention a much more compact desiccant is used, for example in an one-piece, sheet form, that is not in the granulate form. The desiccant, found in the form of a sheet structure or a strip, is placed on the inside of the packaging foil, in particular, by heat sealing, in which the desiccant is suitably solidified and essentially insoluble to the packaging foil and is responsible and is to be solved considerable mechanical expenditure of the foil. With it a clear separation and differentiation of the desiccant from the actual product is guaranteed. Therefore, it cannot lead to a mistake with the desiccant during application. Since the desiccant can no longer move loosely within the package, any damage to the product by the sliding back-and-forth of the desiccant is prevented. By means of a solid, definite attachment of the desiccant in the vicinity of the product within the package, a complete and correct effect of the desiccant is also guaranteed. Since the desiccant is fixed to the packaging foil, the desiccant can be finally unbound carefully in a customary manner from the packaging foil.

[0010] According to any of the previous implementations of the procedure according to the invention, as well as the device according to the invention, a primary packaging foil is prepared in the form of an endless band, preferably by means of continuous operation conveyance facilities. The desiccant is prepared in the form of at least one endless strip, preferably by means of intermittent operation conveyance facilities. The desiccant strip is cut, crosswise to the direction of conveyance, into individual sheet structures or strips, which have the dimensions and which are installed on the primary packaging foil, such that, after being placed on the primary packaging foil and completion of the package, they are arranged only in an area inside of a package unit and not in the closing, in particular the edge-sealing, area of the package-unit.

[0011] Heating appliances for heating of the continuously conveyed primary packaging foil band are provided in the cutting area of the device, as well as a cutting unit for cutting of the, preferably intermittently conveyed, desiccant strips. In the cutting area are some appliances for placing, in particular for pressing and/or for sealing of individual desiccant sheets or desiccant strips cut from the endless

desiccant strips, on to the primary packaging foil band.

[0012] The device according to the invention can be achieved in a single-path implementation form or in a multi-path implementation form. In the single-path form an endless desiccant strip or an endless desiccant path is conveyed into the cutting area, preferably essentially in the same direction of conveyance as the primary packaging foil, in which individual desiccant strips and sheets are cut crosswise to this direction. In the multiple path implementation form the desiccant is prepared in the form of endless strips or paths arranged side-by-side, in particular parallel to each and conveyed into the cutting area, in which the cutting facilities cut individual desiccant strips or sheets crosswise to the direction of conveyance from the several endless desiccant bands, and in which these individually cut desiccant strips or sheets are placed side-by-side, in particular parallel to one-another, on the primary packaging foil.

[0013] Alternative to the preparation of the desiccant in the form of at least one endless strip, the desiccant in the form of at least one large sheet structure can be prepared and be conveyed into the cutting area. By means of a suitable cutting appliance this desiccant sheet structure is cut into small individual desiccant strips and sheets that then are again placed on the primary packaging foil. Thereby even more individual desiccant sheets and strips cut out of the desiccant sheet structure likewise could be placed next to each other on the primary packaging foil.

[0014] The type and alignment of the arrangement of the individual small desiccant strips or desiccant sheets cut from the endless desiccant band or desiccant sheet structure depends on the dimensions of the primary packaging foil used, the product for packaging, the drying action to be achieved, as well as the type and manner of conveyance and construction of the final total package. The dimensions of the endless desiccant strips as well as those of the small individual desiccant strips and sheets, especially with regard to its thickness and its widths and lengths expansions, depends on the volume amount of the desiccant, that is necessary to achieve a specific dryness within an individual package-unit.

Implementation-examples

[0015] further details and advantages of the invention emerge from the following detailed description of a implementation on the basis of the enclosed drawings.

[0016] **Fig. 1a** shows a side view a device according to the invention for the preparation of a packaging foil for moisture-sensitive products;

[0017] **Fig. 1b** shows, in a top view, the path of the packaging foil through the device according to **Fig. 1a**;

[0018] **Fig. 2** shows a partially open packaging unit, produced in the device according to the invention, with a product situated in it.

[0019] As is described in **Fig. 1a**, the desiccant in the form of an endless desiccant T is produced on a storage roll **10**, that is able to be stored in a rotary way on a casing or a flat base **20**. Instead of the storage-roll **10**, other suitable preparation-methods are also thinkable. The endless desiccant strip T is unwound from the storage-roll **10** and over the transport and deflector rolls or -reels **30** conveyed into a cutting area **40**. The conveying device in the form of the storage roll **10** and the Transport- and deflector reels **30** could convey the endless desiccant strip T intermittently thereby either continuously or gradually, and pass into the cutting area **40**.

[0020] In the implementation form shown in **Fig. 1a** only one endless desiccant strip T is stored on the storage roll **10** and conveyed into the cutting **40**. In addition to this single path implementation a multi-path implementation form can also be achieved, in which several endless desiccant strip T pieces are positioned next to each another on the storage roll **10** and next to each another over a correspondingly structured transport and deflector rolls **30**, in particular parallel to each other, are conveyed as thus into the cutting area **40**. Alternatively, also several storage rolls **10** could be positioned next to each other with a corresponding endless desiccant strip T.

[0021] In another implementation not shown, the desiccants can be passed on in the form of a large surface-structure, with game-wisely in form of a desiccant plate, for example in the form of a desiccant plate, that is conveyed as total by means of suitable conveying devices into the cutting area **40**.

[0022] Besides the desiccant T, a packaging material V, for example a packaging foil, is lead that preferably is a heat seal-able foil. This primary packaging foil V is prepared by means of a suitable conveying device (not shown) in the form of an endless band and conveyed. The primary packaging foil V is transported continuously at a constant speed. The arrow **80** in **Fig. 1a** points the direction of conveyance of the primary packaging foil V and the packaging foil combined with the desiccant T constructed out of it.

[0023] In the cutting area **40** the desiccant T is positioned on one face of the primary packaging foil V and preferably fixed, that is removable of only with considerable mechanical expenditure of the primary packaging foil V with which primary packaging foil is connected. The face of the primary packaging foil V on which the desiccant is positioned, after completion that total package for the protection of the moisture sensitive product P, product P is folded on the inside I of the package Vp.

[0024] Preferably, in the case, in which the primary packaging foil V is a heat seal-able foil, a heating device **70** is provided in the cutting area **40**, by means of which the primary packaging foil is passed and heated. The desiccant T is then positioned on the heated packaging foil V and by means of a suitable attaching mechanism bound to the foil, in which, for example, by means of a pressure roll **50** is press onto the packaging foil V and sealed by means of the action of the heating device **70**.

[0025] In the cutting area **40** is located a cutting unit **60**, that cuts the individual small desiccant strips or desiccant sheets Tp from the endless desiccant strip T. The cutting unit **60** includes a pneumatic cylinder **62** and a feeding motor, that, for example, operates like a type of labeling distributor. By means of the cutting unit **60** the endless desiccant band T is intermittently, gradually conveyed or led and cut. The individual desiccant sheets or strips Tp constructed in this manner are positioned on the continuously moving primary packaging foil V by means of the pressure roll **50**. The individually constructed desiccant sheets or strips Tp in this case are installed at a regular distance from each other on the packaging foil V and are conveyed continuously further with them, as it is especially evident from **Fig. 1b**. By means of the feed motor, the distances between the individual desiccant sheets or strips Tp on the packaging

foil V are variably adjustable according to the particular application.

[0026] In another non-illustrated implementation the endless desiccant band T cannot be fed intermittently, but continuously, and in a corresponding alternative manner the primary packaging foils V are not run continuously, but are conveyed intermittently. The construction and functionality of the cutting equipment must be adapted to type of conveyance in each case.

[0027] The desiccant-strips or -sheets Tp in the cutting area 40 are cut from the endless desiccant strip T cross-wise to the direction of conveyance, having dimensions and being positioned on the packaging foil V with the distance from one another, such that after completion of the total package Vp they lie only in an inside area I of a finished package unit Vp, yet not in the closing area R of the package unit Vp. In the case in which the packaging foil V is a heat seal-able foil, the closing areas R are the sealing regions or sealing edges of the package Vp.

[0028] This is especially evident from Fig. 2, that shows a so-called four-edged sealed bag, as it is used, for example, for test strips P. In this implementation the package Vp can be constructed in which a complementary foil (above or below foil) is sealed on the primary packaging foil V provided with the desiccant Tp in which the edges R of the package unit are closed completely all around, in which both foils lying on each other are sealed to each other in the region of the edges R. The desiccant Tp and the product P for packaging are found in the free unsealed inside area I of the package unit Vp. In order to produce an essentially air-tight package Vp, it is important that the desiccant strips Tp are not in the area of the edge-sealer R. If, however, the desiccant strip Tp sticks out into the edge R or out over it, a weak point or air-permeable opening of the package Vp could exist in this area. A package of this type would be deficient and useless.

[0029] The package Vp illustrated in Fig. 2 can alternatively be prepared in which the packaging foil V equipped with the desiccant Tp is folded by suitable facilities in a suitable manner and is folded one on top of the other, for example, in that shown in the right half of that shown in Fig. 1b finished package-foil is folded on the left half of this package-foil and, in the free area R in which no desiccant strip Tp is found, is sealed. In another, more clarifying implementation a

second packaging foil is laid on the packaging foil provided with the desiccant Tp and then also sealed in the desiccant-free area R.

[0030] That in connection to the type constructed device shown in Fig. 1a, closed endless packaging band or packaging sheet structure for constructing individual package unit Vp (Fig. 2) is perforated and/or cut in the desiccant-free area. Therefore, each of the thus-constructed individual package units Vp contains at least one product P and at least one of the desiccant strips Tp cut from the endless desiccant band T.

[0031] In the case of the above indicated multi-path implementations in which the desiccants T in the form of several strips prepared next to one another and is conveyed into the cutting area 40, after the cutting of the desiccant strips T, positions a corresponding number of individual, small desiccant strips or sheets Tp, next to each other cross-wise to the direction of conveyance 80 of the packaging foil V and preferably parallel to each other on the packaging foil. In this case, the packaging foil shown in Fig. 1b is found beside the row displayed here of the desiccant Tp corresponding further rows of desiccants Tp. From these thus-structured packaging foils, then end package-units could be constructed that are executed and arranged differently, as it is displayed in Fig. 2. That in each case the choice of the implementation of a package depends on the respective application and especially on the moisture sensitivity of the products to be packaged.

[0032] In the case of the multi-path implementation, instead of the endless desiccant strips arranged next to each other on one or more storage rolls, also a rotating cutter and carrying of the desiccant strips also comes into consideration. Also further possibilities for implementation of the multi-path variation and corresponding developments of the present invention are possible.

[0033] In the case that the desiccant is not prepared as endless desiccant strips T but as desiccant sheet structures, which is not shown in the figures, the desiccant sheet structure by some cutting device is cut in an analogous way into individual, small desiccant sheets or strips Tp, of which in turn has the dimensions and of which are positioned on the primary packaging foil such that after the positioning on the primary packaging foil and finishing of the package Vp

they are in turn positioned only in an inner area I of the packaging unit and not in the closing areas R of the packaging unit, in the case of heat-sealable foils, then, consequently especially not in the area of the edge sealer R. Also, in the case of a desiccant sheet structure several individually desiccant sheets or strips cut cross-wise to the conveyance direction of the primary packaging foil V could be positioned on the primary packaging foil next to each other and especially parallel to each other.

[0034] Although the invention presents in the example a so-called four-edge sealed bag displayed in Fig. 2 four edge-seal-bag was expounded, it is also possible in an analogous manner that the desiccant-strips are found in the case of tube bag packaging machines on one or more foils of the tube-bags to be formed or in the case of blister packaging machines on one or more foils of the blister packaging to structure. In an analogous manner, the invention includes also the construction of additional packages for moisture sensitive products.

Patent Claims

1. Procedures for producing a packaging foil for moisture-sensitive products (P), by the following steps:

- Preparation of a primary packaging foil (V), in particular heat seal-able foil;
- Preparation of a desiccant (T); characterized by means of the following steps:
 - Preparation of a desiccant (T) in form of at least a sheet structure or at least a strip;
 - Placing, in particular sealing, the desiccant T onto the face of the package-primary-foil (V), that after a final stage of a package (Vp) for moisture-sensitive products (P) in which the product (P) rests, folded on inside (I) of the package (VP).

2. Procedure according to Claim 1, characterized by the following steps:

- Preparation of the primary packaging foil (V) as a continuous driven endless tape;
- Preparation of the desiccant (T) as at least an intermittently driven endless tape;
- Cutting of the desiccant sheet structure (T) into individual sheet structures or strips (Tp), of which have the measurements and which are installed on the primary packaging foil (V), so that after being placed on the primary packaging foil (V) and completion of the

packaging (Vp), they are arranged only in an area inside (I) of a packaging unit (Vp) and not in the closing, in particular the seal-edges, area (R) of the package-unit (Vp)

3. Procedure according to Claim 2, characterized by the following steps:

- Intermittently conveys at least one endless-strip desiccant (T) into a cutting area **(40)**;
- Heating of the continuously conveyed primary packaging foil band (V) into the cutting area **(40)**;
- Placing, in particular sealing, the individual desiccant sheets or strips (Tp), cut from the endless desiccant strip (T) in the cutting area **(40)**, onto the primary packaging foil band (V).

4. Procedure according to Claim 2 or 3, characterized in that the desiccant (T) is prepared in the form of several strips arranged side by side, especially parallel to each other, that are cut crosswise to the direction of conveyance and installed side by side, especially parallel to each other, on the primary packaging foil (V).

5. Procedure according to Claim 1, characterized by the following steps:

- Preparation of the primary packaging foil (V) as a continuously driven endless band;
- Preparation of the desiccant (T) in the form of at least a sheet structure;
- Cutting of the desiccant sheet structure (T) into individual sheet structures or strips (Tp), which have the measurements and which are installed on the primary packaging foil (V), so that after being placed on the primary packaging foil (V) and completion of the packaging (Vp), they are arranged only in an area inside (I) of a packaging unit (Vp) and not in the closing, in particular the seal-edges, area (R) of the package-unit (Vp).

6. Procedure according to Claim 5, characterized by the following steps:

- Feeding of at least one desiccant sheet structure (T) into a cutting unit **(40)**;
- Heating of the continuously conveyed primary packaging foil band (V) into the cutting unit **(40)**;
- Placing, in particular sealing, of individual sheets or strips, cut from the desiccant sheet or the desiccant strip (Tp) in the cutting unit **(40)**, onto the heated primary packaging foil band (V).

7. Procedure according to either of the claims 5 or 6, characterized therein, that several individual desiccant sheets or desiccant strips (Tp) cut from the desiccant sheet structure (T)

are placed side by side, in particular, parallel to each other diagonal to the direction of conveyance **(80)**, on the primary packaging foil (V).

8. Procedure according to any one of the claims 2 to 7, characterized therein, that the conveyance direction of the endless desiccant strip (T) or the desiccant sheet structure in the cutting unit **(40)** corresponds to direction of conveyance **(80)** of the primary packaging foil.

9. Procedure according to any of claims 2 or 8, characterized therein, that the individually cut desiccant sheets or desiccant strips (Tp) are placed essentially undetachable onto the primary packaging foil (V).

10. Procedure for packaging of moisture sensitive products (P), characterized by the following steps:

- Production of a packaging foil for the product (P) by mean of the procedure according to any one of the aforementioned claims;
- Preparation at least one product (P) for packaging and conveying of the product (P) to the packaging foil;
- Closing of the packaging (Vp) with the product (P) arranged in it, in which the packaging foil (V) provided with the desiccant (T) is folded on each other or connected with another packaging foil, in particular by heat-sealing of the sealed edges (R) of the packaging foils.

11. Procedure according to claim 10, characterized therein, that a structured endless packaging band is perforated and/or cut for construction of individual packaging units (Vp), in which each packaging unit (Vp) contains at least one product (P) and one or more of the structured desiccant sheets or desiccant strips (Tp).

12. Device for the production of a packaging foil for moisture-sensitive products (P), with the following characteristics,

- Method for the preparation of a primary packaging foil (V), in particular a heat seal-able foil;
- Methods **(10)** for the preparation of a desiccant (T); specified by the following characteristics:
- Methods **(10)** for preparation of the desiccant (T) in the form of at least one sheet structure or at least one strip;
- Methods for placing, in particular for sealing, the desiccant T onto the face of the package-primary-foil (V), that after a final stage of a

package (Vp) for moisture-sensitive products (P) in which the product (P) rests, folded on inside (I) of the package (VP).

13. Device according to claim 12, specified by the characteristics:

- Conveying facilities for the preparation of the primary packaging foil (V) in the form of an endless band;
- Conveying facilities **(10, 30)** for the preparation of desiccant (T) in the form of at least one endless strip;
- Cutting facilities **(60)** for cutting of the desiccant sheet structure (T) into individual sheet structures or strips (Tp), which have the dimensions and which are installed on the primary packaging foil (V), such that after being placed on the primary packaging foil (V) and the completion of the package (Vp), they are arranged only in an area inside (I) of a package-unit (Vp) and not in the closing, in particular the seal-edges, area (R) of the package-unit (Vp).

14 Device according claim 13, specified by the following characteristics:

- Intermittently operating facilities **(30, 60)** for supplying at least one endless strip (T) into a cutting area **(40)**;
- continuous operation conveyance facility for the primary packaging foil band (V);
- Facilities for heating **(70)** the primary packaging foil band (V) in the cutting area **(40)**;
- Facilities **(50)** for mounting, in particular for sealing, of the individual desiccant sheets or desiccant strips (Tp), cut out of the endless desiccant strip (T) in the cutting area **(40)**, onto the heated primary packaging foil band (V).

15. Device according to either one of the claims 13 or 14, characterized by facilities **(10, 30)** for the preparation of the desiccant (T) in the form of several strips arranged side by side, especially parallel to each other, as well as by cutting facilities **(60)** for cutting the desiccant strips (T) crosswise to its direction of conveyance, so that the cut desiccant strips (T) are arranged side by side, in particular parallel to each other, on the primary packaging foil (V).

16. Device according to any one of the claims 13 to 15 characterized therein, that the conveying and preparation facilities for the desiccant include at least a storage roller **(10)** as well as guide and conveyor rollers **(30)**.

17. Device according to any one of the claims 13 to 16 characterized therein, that in the

cutting area (40) is located a cutting installation (60) for cutting the desiccant strips (T), at least one hot plate (70) for heating the primary packaging foil bands (V), as well as at least one pressure roller (50) for placing, in particular sealing, of individual desiccant strips or desiccant sheets (Tp), cut out of the endless desiccant strip (T), onto the heated primary packaging foil band..

18. Device according to any one of the claims 12 to 17 characterized therein, that the conveying direction of the endless desiccant strip (T) into the cutting area (40) corresponds to the conveying direction (80) of the primary packaging foil (V).

19. Device according to any one of the claims 12 to 16 characterized therein, that the individually cut desiccant sheets or desiccant strips (Tp), are essentially insoluble to the primary packaging foil (V).

20. Device for packaging moisture-sensitive products (P), specified by means of the following characteristics:

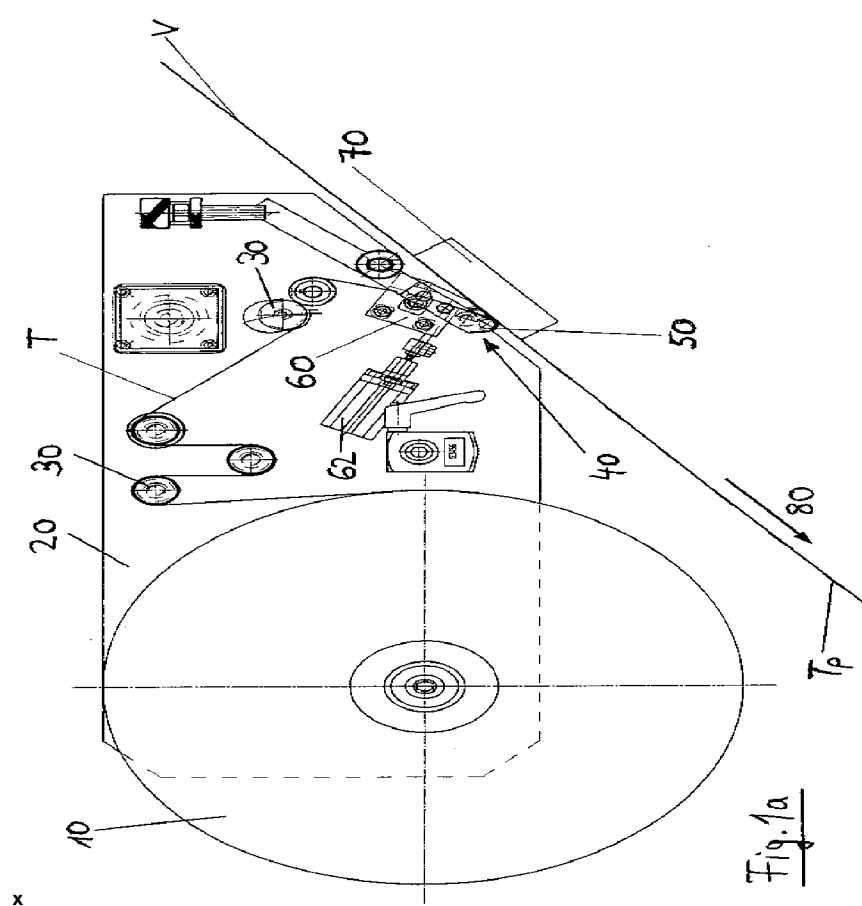
- Device for producing a packaging foil for products (P) according to any one of the claims 12 to 19;
- Facilities for the preparation of at least one product (P) for packaging and for conveying the products (P) to the packaging foil;
- Facilities for closing the package (Vp) with the product (P) located in it, facilities for folding of the packaging foil (V) provided with the desiccant (T) on top of each other or for binding of the packaging foils (V), provided with the displayed desiccant (T), with another packaging foil, in particular heat-sealing facilities for edge-sealing (R) of the packaging foils.

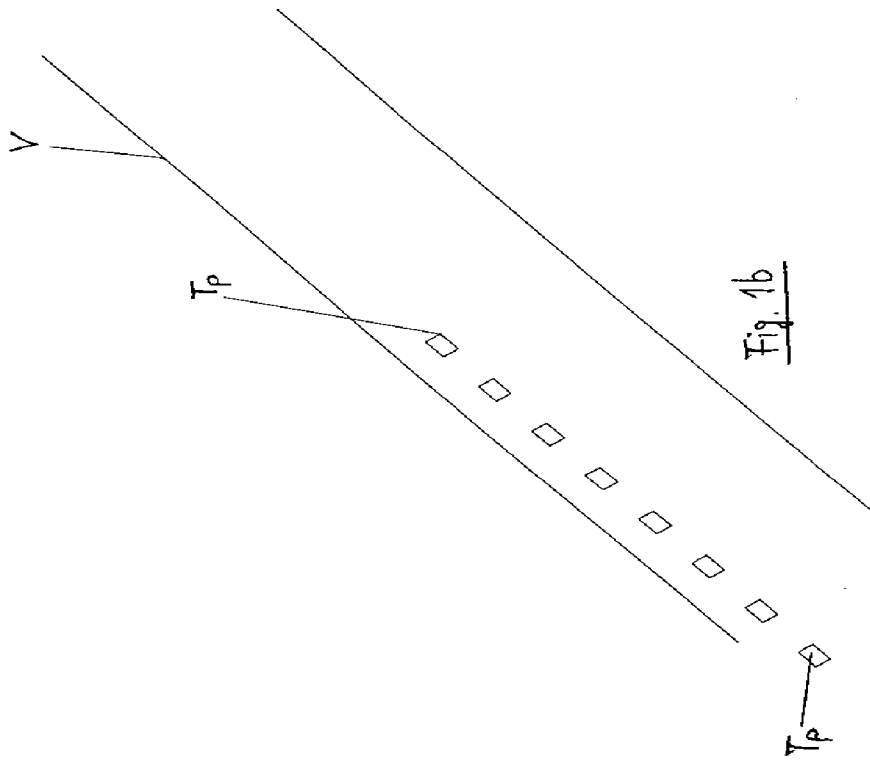
21. Device according to claim 20, characterized by facilities for perforating and/or cutting an endless packaging band structure for constructing individual package-units (Vp), in which each package-unit (Vp) contains at least one product (P) and one or more desiccant sheets or desiccant strip structures (Tp)

3 pages of drawings follow

Appendix

Drawings





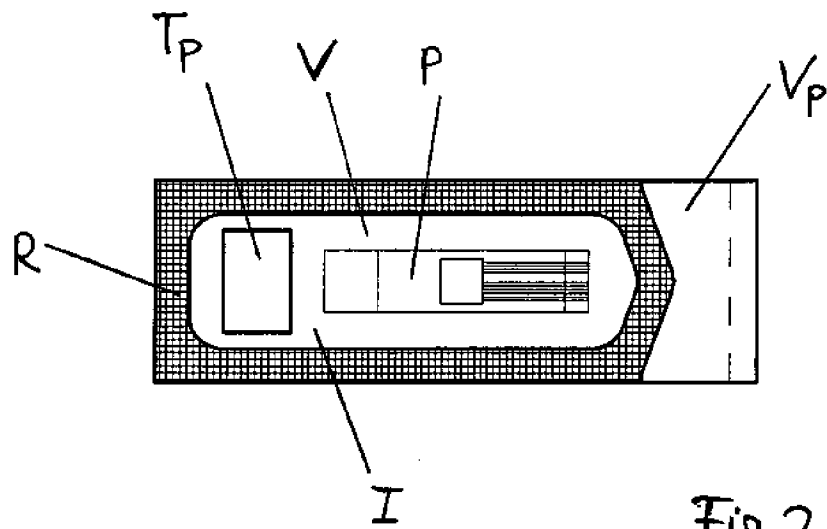


Fig. 2